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Does Schooling Affect Socioeconomic Inequalities in Educational Attainment? Evidence from a Natural Experiment in Germany

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Abstract: Critical theories of education and the dynamics of skill formation model predict that the education system reproduces socioeconomic inequalities in educational attainment. Previous empirical studies comparing changes in socioeconomic inequalities in academic performance over the summer to changes in these inequalities during the school year have argued, however, that schooling reduces inequalities in educational performance. The present study highlights the question of whether schooling affects socioeconomic inequalities in educational attainment by analyzing a natural experiment that induces exogenous variation in the length of schooling and allowed me to investigate the causal, long-term effects of the length of schooling on inequalities in educational attainment. Some German states moved the school start from spring to summer in 1966/1967 and introduced two short school years, each of which was three months shorter than a regular school year. I use variation in the short school years across cohorts and states to estimate the causal effects of the length of schooling on socioeconomic inequalities in educational attainment based on two German panel surveys. Less schooling due to the short school years did not affect inequalities in educational attainment. This finding runs counter to the results from the summer learning literature and to the predictions of the dynamics of skill formation model and critical theories of education. I conclude by discussing the implications of this finding for our understanding of socioeconomic inequalities in educational attainment.

Keywords: education; inequality in educational attainment; natural experiment; schooling

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In modern societies, education in formal institutions has become a fundamental part of the human life course. Liberal thinkers such as John Dewey (1966) and Ralf Dahrendorf (1965) emphasized the equalizing role of the education system, arguing that equality of educational opportunity can be achieved only through schooling. The role of schooling has, however, not been uncontroversial. Several sociological theories argue that the education system reproduces educational inequalities. For example, cultural capital theory is developed around the claim that the education system rewards children for their cultural capital, which is transmitted to them from their parents and does not increase their educational performance (Bourdieu and Passeron 1966, 1970; Bourdieu 1979). Further support for this perspective comes from Willis' (1978) ethnographic study of English working-class children who develop a "counterschool culture" that does not allow them to profit from schooling. Bowles and Gintis (1976, 2002) argued that the American school system reproduces social hierarchies because it prepares working-class children for working-class jobs by forcing them to accept the hierarchy in the education system, which resembles the hierarchy in the capitalist economy.

Following these theoretical and, on an empirical level, descriptive investigations from the 1970s, several more recent sociological studies have employed natural experiments to identify the causal effects of schooling on the reproduction of educational inequalities. The evidence of these studies, as reviewed by Raudenbush and Eschmann (2015), provides no support for the theories developed by Bourdieu, Passeron, Willis, Bowles, and Gintis. On the contrary, some of these natural experiments have suggested that schooling reduces socioeconomic inequalities in educational performance. In particular, a number of empirical studies have shown that socioeconomic differences in skills grow more during the summer, when no schooling takes place, than during the school year (Heyns 1978, 1987; Entwisle and Alexander 1992; Alexander, Entwisle, and Olson 2001, 2007; Burkam et al. 2004; Downey, von Hippel, and Broh 2004; Verachtert et al. 2009; Holtmann and Bernardi 2019).

More recently, however, methodological critiques of these studies have emerged, arguing that after measurement error is considered, the increases in socioeconomic inequalities in skills during the summer are smaller than was previously assumed and of little substantive importance (von Hippel, Workman, and Downey 2018; von Hippel and Hamrock 2019; Workman, von Hippel, and Merry 2023). In addition, evidence from other studies does not find that the benefits of more schooling for skill development vary by family socioeconomic background (Carlsson et al. 2015; Passaretta and Skopek 2021). In economics, the dynamics of skill formation model also predicts that "skills beget skills and abilities beget abilities" (Cunha and Heckman 2007:10). Therefore, children from socioeconomically advantaged families should profit more from schooling than children from socioeconomically disadvantaged families (Raudenbush and Eschmann 2015). Finally, recent ethnographic evidence suggests that, in line with Willis' (1978) study of English schoolchildren, for instance, universities can increase the intergenerational transmission of educational advantage (Armstrong and Hamilton 2015). Thus, evidence on the effects of schooling on the intergenerational transmission of education is mixed, and new studies are needed. Natural experiments provide exogenous variation in the length of schooling and can allow researchers—under certain assumptions—to estimate causal effects of the length of schooling.

Previous empirical studies have estimated the short-term effects of schooling on socioeconomic differences in educational performance measured through cognitive skills and test scores. The present study investigates the long-term effects of the length of schooling on the intergenerational transmission of educational attainment. Such an investigation is important, as short-term effects may not necessarily translate into long-term effects.

In the present study, I estimate the effects of the length of schooling on the intergenerational transmission of educational attainment by exploiting the natural experiment of the short school years that occurred in Germany in 1966 and 1967. Several German states decided in 1964 to move the start of the school year from after Easter (April) to late summer (August/September). To achieve this change, these states introduced two short school years in 1966/1967 (Helbig and Nikolai 2015). These short school years ran for 9 months instead of 12. For this reason, students in school during both short school years were exposed to up to 6 months

less schooling than their counterparts who were in school after or before the short school years took place. The identification of the effect of the short school years on the intergenerational transmission of educational attainment is facilitated by the fact that some German states did not implement the short school years and can therefore be used as a control group. The identification strategy therefore closely resembles a difference-in-differences (DiD) design with the additional advantage that there are before-treatment, treatment, and after-treatment groups.

Meister (1972) and Thiel (1973) estimated the short-term effects of the short school years on pupils' test scores while they were still in school.[1] Pischke (2007) investigated the effects of the short school years on employment and earnings. These studies found no effect of the short school years on educational performance, educational attainment, earnings, and employment (Meister 1972; Thiel 1973; Pischke 2007).[2] With respect to educational attainment, such a finding is not surprising, as teachers may have had in mind certain quotas of how many students they sent to the upper track in secondary school independent of the school year's length. The present study, however, investigates the long-term consequences of the short school years in 1966/1967 in Germany for socioeconomic differences in educational attainment. Even if the number of students promoted to the upper track in secondary school did not change due to the short school years, the composition of those who were promoted by social origin could have changed due to the length of schooling. Such a change is precisely what the theories motivating this study predict. These theories are discussed in detail in the next section.

In the German school system, back in the time period I study and nowadays, children are allocated to different tracks at age 10. This tracking is strongly based on primary school performance. The present analysis is motivated by the idea that the amount of time children spent in primary school prior to this transition may affect socioeconomic differences in educational performance at the time of the transition to secondary school. We know that even in the German education system, with its early tracking at age 10, the larger part of socioeconomic inequalities in education is due to socioeconomic differences in educational performance than due to socioeconomic differences in educational decision making (55% for the former and 45% for the later according to Jackson and Jonsson 2013:321). Compared to the other countries included in Jackson and Jonsson (2013), Germany is an average case when it comes to the size of primary and secondary effects.[3]

Does Schooling Increase or Decrease Socioeconomic Inequalities in Educational Attainment?

The function of schooling in a society is a debated issue. Economists often see the education system's primary purpose as improving children's skill development (Hanushek 1979; Heckman 2000; Cunha and Heckman 2007; Bradbury et al. 2015). Functional theories developed in sociology attribute to education the main function of matching students to labor market positions (Davis and Moore 1945; Parsons 1959; Sorokin 1959).

Although the role of schooling is perceived as positive in functional theories, it is criticized from a Marxist perspective. Arguing that the school system prepares children to accept the hierarchies in the capitalist economy, Bowles and Gintis (1976:11) wrote that schools "create and reinforce patterns of social class, racial and sexual identification among students which allow them to relate 'properly' to their eventual standing in the hierarchy of authority and status in the production process." If children spend more time in school, there is more time for this process to play out. Therefore, Bowles and Gintis' (1976) theory expects more schooling to increase the intergenerational transmission of educational attainment.

Cultural capital theory, as developed by Bourdieu and Passeron (1966, 1970) and Bourdieu (1979), also argues that the school system reproduces inequalities in educational attainment. This theory is based on the claim that the education system values cultural capital, which is transmitted from parents to their offspring. Importantly, this is due not to cultural capital increasing children's educational performance but to teachers' positive views of the socioeconomically advantaged social classes' cultural capital.[4] If children spend more time in school, those with higher levels of cultural capital have more time to make their teachers aware of their cultural capital. Cultural capital theory therefore also predicts that more schooling results in a higher transmission of educational attainment across generations.

Further empirical support for the notion that schooling increases inequality in educational attainment comes from an ethnography of pupils from working-class families in the United Kingdom (Willis 1978). The working-class pupils observed in this ethnography developed a counterschool culture. More schooling did not change the counterschool culture and therefore did not benefit the offspring of working-class families.[5] Therefore, only children from socioeconomically advantaged families will profit from more schooling. This perspective leads us to expect an increase in the intergenerational transmission of educational attainment as a consequence of an increase in the length of schooling.

A further reason why schooling may reproduce socioeconomic inequalities in educational attainment is ability grouping and tracking within schools (Oakes 2005). In addition, the quality of schools that children from socioeconomically advantaged families attend may be better than the quality of schools that children from socioeconomically disadvantaged families attend. Within the same schools, children from socioeconomically advantaged families may ask for and receive more support from teachers than children from socioeconomically disadvantaged families (Calarco 2018).

Finally, the dynamics of skill formation model in economics predicts that students from socioeconomically advantaged families will profit more from schooling than children from socioeconomically disadvantaged families (Heckman 2000; Cunha and Heckman 2007; Raudenbush and Eschmann 2015). The model is motivated by the central idea that "skills beget skills and abilities beget abilities" (Cunha and Heckman 2007:10). Children from socioeconomically advantaged families have more skills at the start of school. According to the dynamics of skill formation model, these children profit more from schooling than children from socioeconomically disadvantaged families. Therefore, the dynamics of skill formation model

makes the same prediction as critical theories of education: More schooling will increase socioeconomic inequalities in educational attainment.

Contrary to these sociological and economic theories, liberal philosophers have argued that schooling has an equalizing function (Dahrendorf 1965; Dewey 1966). Differences in the learning environment at home between socioeconomic groups may be larger than differences in the school environment (Raudenbush and Eschmann 2015). If that is the case, schooling does reduce socioeconomic inequalities in educational attainment. Lareau's (2011) ethnographic work found that children from socioeconomically advantaged families participated in educationally oriented activities while out of school. In contrast, children from socioeconomically disadvantaged families had more free time and liberty to do what they liked. As a result, the "schools as equalizer" (Downey, von Hippel, and Broh 2004) hypothesis argues that reducing the length of schooling increases the intergenerational transmission of educational attainment.

In summary, there are sociological theories arguing that increasing the length of schooling strengthens the intergenerational transmission of educational attainment as well as an opposing theoretical perspective according to which more schooling leads to more socioeconomic inequalities in educational attainment. Solving the question of whether schooling increases or decreases the intergenerational transmission of educational attainment is therefore an empirical task. Most empirical tests of the effects of the length of schooling on socioeconomic inequalities in education thus far have focused on the question of whether schooling reduces or increases socioeconomic inequalities in educational performance. In contrast, my study estimates the long-term effects of the length of schooling on socioeconomic inequalities in educational attainment by measuring educational attainment through the highest educational degree completed.

Raudenbush and Eschmann (2015) provided an overview of the literature using different natural experiments to estimate the effects of schooling on socioeconomic inequalities in children's skills. They reviewed studies estimating the effects of free and universal education in early childhood, summer vacation, the extension of the school day, and changes in the length of compulsory schooling on socioeconomic inequalities in educational performance.

The arguably best known of these studies compared differences in learning rates by family socioeconomic background during the school year to differences in learning rates by family socioeconomic background during the summer, when no schooling takes place. Alexander, Entwisle, and Olson (2001, 2007) demonstrated that in a sample of students from Baltimore, socioeconomic differences in learning grew more over the summer than over the school year. Downey et al. (2004) replicated these results for a sample representative of the United States. Condron, Downey, and Kuhfeld (2021) provided evidence that schooling also reduces overall inequality in skills between students. Most research on the effects of summer vacation on learning inequalities used data from the United States, but Holtmann and Bernardi (2019) and Verachtert et al. (2009) also found evidence of this dynamic in Europe.

Von Hippel and Hamrock (2019) provided a critique of the research comparing inequalities in learning over the summer to inequalities in learning during the

school year. They argued that most previous results in the literature in this area were affected by two sources of measurement error. First, the results were influenced by the scaling method used to evaluate children's performance. Second, changes in the type of test administered before and after the summer break influenced the results. Correcting in their own empirical analysis for these types of measurement errors led von Hippel and Hamrock (2019) to conclude that socioeconomic differences in children's educational performance were already in place before formal schooling started and did not systematically grow or shrink more in summer than during the school year.

Passaretta and Skopek (2021) pointed out another problem in the research design employed in the summer learning literature. The research design must assume that any differences in learning rates between the summer and the school year are due to the absence of schooling. However, there may be factors related to summer other than the absence of schooling that affect socioeconomic inequalities in educational performance. For instance, the weather in Europe and the United States (the countries on which the summer learning literature has focused) is warmer during the summer and there is more daylight. Therefore, there are more opportunities to spend time outside, which may positively affect the development of skills (Laidley and Conley 2018).

Comparing socioeconomic differences in skill development over the summer to socioeconomic differences in skill development during the school year is not the only research design that has been used to estimate the effects of schooling on socioeconomic inequalities in educational performance. Passaretta and Skopek (2021) used differences in age at testing to estimate the effects of days in the first grade in primary school on socioeconomic inequalities in educational performance in Germany. They found that schooling increased skills but that these skill returns to schooling did not vary by family socioeconomic background. In a similar analysis, using measures of intelligence from military conscription tests among male adolescents in Sweden, Carlsson et al. (2015) found no socioeconomic differences in the effects of the number of school days on intelligence.

In contrast to these previous studies, which focused on the short-term effects of the length of schooling on socioeconomic differences in academic performance, the present study investigates the long-term consequences of the amount of schooling on socioeconomic inequalities in educational attainment. Such a shift in focus is important because, currently, we do not know whether short-term effects of the quantity of schooling on socioeconomic differences in academic performance (which have been analyzed by most previous research) have long-lasting consequences for socioeconomic inequalities in educational attainment.

The Natural Experiment of the German Short School Years

My study estimates whether schooling increases or decreases socioeconomic inequalities in educational attainment by exploiting the German short school years, which reduced the length of schooling for some students by approximately 6 months, as a natural experiment. Pischke (2007) analyzed the effects of the German short school years on student performance and earnings, which was his main focus.

Earlier studies also estimated the effects of the short school years on student performance (Meister 1972; Thiel 1973). However, none of these studies investigated the effects of the short school years on socioeconomic inequalities in educational attainment, which is the focus of the present study.

The short school years were the result of a change in the month in which the school year started. Before the reform, the school year started in all (West) German states, with the exception of Bavaria, after the Easter holidays (i.e., in April). Bavaria, along with other European countries, started the school year in August. In 1964, the German state governments decided collectively to move the school start in all states to the summer (August or September; Pischke 2007; Helbig and Nikolai 2015). Initially, the agreement was to accomplish this change by introducing one long school year that would run from April to August of the next year. However, only the state of Hamburg implemented this solution. Bavaria, as mentioned above, did not have to change the start of the school year, as it already started in August before the reform. For these reasons, Hamburg and Bavaria are used as the control group in the empirical analysis.

Eight West German states (Baden-Württemberg, Bremen, Hesse, Lower Saxony, North Rhine-Westphalia, Rhineland-Palatinate, Saarland, and Schleswig-Holstein) accomplished the change in the start of the school year by introducing two short school years that ran from April 1966 until November 1966 and from December 1966 until July 1967. In other words, pupils who attended school during these years completed two grades with a reduced length of instruction from 12 to 9 months (not counting the holidays, the length of which were not affected by the reform). As a result, students exposed to the full two short school years in primary school spent approximately 6 months less in primary school than the cohorts not affected by the short school years.

Importantly, the policy change in shortening the school year by about 12.5% was not accompanied by a change in the curriculum (Pischke 2007). In addition, teachers did not compensate for the loss in instruction time over the year by increasing the number of class hours per week. Based on a survey of teachers, Thiel (1973) concluded that most teachers did not offer additional classes, and those who did provided at most one hour more of teaching per week. Pischke (2007:1226) also showed that teachers were not ill more often during the short school years than before or after them. In sum, there is no evidence that strong compensatory measures were taken to counteract the reduction in instruction time that resulted from shortening the school year. The natural experiment of the short school years in West Germany in 1966/1967 therefore has general implications for reductions in instruction time.

In the empirical analysis, I focus on the effects of the short school years that respondents experienced while they were in primary school. The reason for this focus is the central role of early tracking, which occurs in Germany after 4 years of primary school (Hillmert and Jacob 2010; Henninges, Traini, and Kleinert 2019). In particular, attending university requires the completion of the highest level of upper secondary education (*Gymnasium*). The transition to *Gymnasium* is made after 4 years of primary school at approximately age 10. Therefore, exposure to the short school years in primary school is most relevant for final educational attainment.

It is important to understand how the natural experiment analyzed in the present study differs from the natural experiments employed by previous research to study the effects of schooling on inequalities in educational performance. In contrast to the literature on summer learning, the focus of the present study is on the consequences of shortening instruction time. This shortening of instruction time by approximately 6 months is particularly crucial in the German education system, as students make the transition to secondary school in Germany after only 4 years of primary school. I estimate how the transition to different types of secondary school is affected by a considerable reduction (6/48 months = 12.5%) in the time students are in school before this transition is made.

Of the three previous studies analyzing the effects of the short school years on educational attainment (Meister 1972; Thiel 1973; Pischke 2007), only Meister (1972:115) reported results stratified by family socioeconomic background. He distinguished between two socioeconomic classes based on father's occupation, referred to as working and middle class, and showed that the increase in performance in reading and math among pupils who experienced the short school years was more pronounced in working-class than in middle-class families. In other words, Meister's (1972) results, which were based on the before-and-after comparison of pupils attending schools in one city in one of the eight states that implemented the short school years,[6] suggested that both average academic performance and equality in academic performance increased through the two short school years (in line with critical theories of education and the dynamics of skill formation model). The present study provides the first analysis of the long-term consequences of the German short school years on socioeconomic inequalities in educational attainment. It also uses a more robust research design exploiting variation across both states and cohorts to estimate the causal effects of the length of schooling on the intergenerational transmission of educational attainment, and it employs data that are nationally representative of (West) Germany.

Data, Measures, and Analytic Strategy

Data

The empirical analysis employs two nationally representative survey data sets from Germany. The data sources are the German Socio-Economic Panel Study (SOEP; Goebel et al. 2019) and the Starting Cohort 6 of the National Educational Panel Study (NEPS; Blossfeld, Roßbach, and von Maurice 2011). I harmonize the variables across the two data sets and pool both data sets to increase the precision of point estimates.[7]

The sample is restricted to women and men born between 1951 and 1965. This sample selection ensures that the birth years affected by the short school years in primary school (1956 to 1960) as well as some birth years before (1951 to 1955) and after (1961 to 1965) the reform are used. The sample is restricted to respondents who lived in the Federal Republic of Germany ("West Germany") before 1989, as the reforms were implemented in this country. In other words, respondents who lived abroad or in the German Democratic Republic ("East Germany") are excluded from

the analysis. I also exclude respondents from Berlin from the analysis sample, as this was the only state in West Germany in which primary school was 6 years long and therefore 2 years longer than in all other states. As a result, the respondents in the analysis sample come from 10 states (Baden-Württemberg, Bavaria, Bremen, Hamburg, Hesse, Lower Saxony, North Rhine-Westphalia, Rhineland-Palatinate, Saarland, and Schleswig-Holstein). Eight of these states belong to the treatment group, as they implemented the short school years; two (Bavaria and Hamburg) did not and are therefore part of the control group.[8]

The do files to replicate the analyses in this study as well as descriptions about how the data can be obtained via the data providers are available online at https://osf.io/bgcth/. The data cannot be shared due to legal reasons, but every researcher can obtain the data after having signed a data agreement with the data providers. After having obtained the data, the do files provided online will allow the complete replication of all results of this study.

Measures

Educational Attainment. The main outcome of the analysis is the completion of upper secondary education (level 3 of the International Standard Classification of Education [ISCED]). In both data sets, a respondent's highest level of education is observed. This information is recoded in a binary variable that is set to 1 for women and men who completed upper secondary education. This level of education at the time of the reform was the major dividing line in the German education system (Dahrendorf 1965) and still is today, as Germany has, compared to other countries, a rather low level of university education (Helbig and Nikolai 2015). As a robustness check, I also report results using (a) years of schooling as a continuous indicator of educational attainment and (b) a binary variable for university education. The variable measures the years of schooling corresponding to the highest educational degree obtained by the respondent.

Household Income. In addition to educational attainment, I investigate the consequences of the German short school years for respondents' current household income. Because this variable is measured in two different ways in the two data sets, I standardize the variable within each data set. The results should therefore be interpreted in terms of standard deviations. Using household income allows me to investigate the effects of the short school years not only on socioeconomic differences in educational attainment but also on socioeconomic differences in labor market outcomes.

Social Origin. Social origin is measured in three ways. First, I use information on mother's and father's education. A binary variable is constructed that is set to 1 if either parent completed the upper track in the German education system (*Gymnasium*).[9] This corresponds to a high level of parental education. Second, as a robustness check, I employ a measure of parental years of education using the years of education of the parent with the highest value. Third, as a further robustness check, I report results using measures of father's and mother's occupational status based on the ISEI (International Socio-Economic Index of Occupational Status;

Ganzeboom and Treiman 1996).[10] The results are virtually identical across all three measures of social origin.

Short School Years. The main independent variable is the number of short school years a respondent experienced while in primary school. This variable is continuous and includes values of 0, 1, and 2.[11] Given that primary school in Germany is four years long, it means that those respondents who were fully exposed to the short school years spent half of their time in primary school in short and the other half in regular (i.e., long) school years. In Germany, students in regular school years enter primary school in the first school year after they turned 6, relative to a cut-off date. This cut-off date was on December 31 for the cohorts born in 1959 and earlier. It was moved to June 30 for the cohorts born in 1960 and later. The short school years occurred in April to November 1966 and December to July 1967 (Pischke 2007; Helbig and Nikolai 2015). Pupils born in 1959 (independent of their month of birth) entered school in April 1966, whereas students born in 1958 (independent of their month of birth) entered school in April 1965. Students born in 1957 entered school in April 1964. They all experienced two short school years while in primary school. Students born in 1956 entered school in 1963 and had already completed three full years in primary school when the short school years were introduced. They were therefore exposed to the first short school year, running from April to November 1966 in their last year of primary school, and transitioned to secondary school in December 1967.[12] Pupils who were born in the first 6 months of 1960 entered school in December 1966 and therefore experienced one short school year.[13] Students born in the second 6 months of 1960 and the first 6 months of 1961 entered school in August 1967 and therefore experienced no short school years. Students born in 1955 and earlier were already in secondary school or had already completed their schooling before the short school years occurred. They are therefore assigned a value of 0 for the short school years variable. In addition, students from Hamburg and Bayern are assigned a 0 for this variable independent of their year of birth, as these states did not have short school years. The coding of the short school years variable is also summarized in Table 1.

A potential source of bias could be that the data provide information only on the current state of residence at the time of the interview and not of the state where a respondent was born or, which would make the analysis most reliable, where they went to school. It is, however, quite uncommon to move between states in Germany, especially among the cohorts I study (Pischke 2007). For instance, all states in Germany have universities, and students usually attend university in the same state in which they went to school. Therefore, the bias introduced by this data limitation is likely to be small. If there is any remaining bias, it should be random measurement error, as it is unlikely that residential changes are connected to the short school years (Pischke 2007).

Control Variables. All models control for sex via a dummy variable that is set to 1 for male respondents. In addition, all models control for a dummy for the survey in which a respondent participated (SOEP or NEPS). Descriptive statistics on all variables used in the analysis are provided in Table 2.

Table 1: Exposure to the Short School Years by Year and Month of Birth in the Treatment States

Year of birth	Month of birth	School entry date	Number of short school years in primary school
1951	January–June	April 1958	0
1951	August–December	April 1958	0
1952	January–June	April 1959	0
1952	August–December	April 1959	0
1953	January–June	April 1960	0
1953	August–December	April 1960	0
1954	January–June	April 1961	0
1954	August–December	April 1961	0
1955	January–June	April 1962	0
1955	August–December	April 1962	0
1956	January–June	April 1963	1
1956	August–December	April 1963	1
1957	January–June	April 1964	2
1957	August–December	April 1964	2
1958	January–June	April 1965	2
1958	August–December	April 1965	2
1959	January–June	April 1966	2
1959	August–December	April 1966	2
1960[1]	January–June	December 1966	1
1960	August–December	August 1967	0
1961	January–June	August 1967	0
1961	August–December	August 1968	0
1962	January–June	August 1968	0
1962	August–December	August 1969	0
1963	January–June	August 1969	0
1963	August–December	August 1970	0
1964	January–June	August 1970	0
1964	August–December	August 1971	0
1965	January–June	August 1971	0
1965	August–December	August 1972	0

[1] Students from Lower Saxony born between January and June 1960 entered school only in August 1967 and experienced no short school year (see Footnote 13 in the main text).

Hypotheses and Analytic Strategy

Critical theories of schooling and the dynamics of skill formation model predict that shortening the length of schooling will decrease the intergenerational transmission of education. In contrast, the "schools as equalizer" (Downey et al. 2004) hypothesis argues that if children spend less time in school, the intergenerational transmission of education should increase. To test these opposing hypotheses against each other, I exploit variation in the implementation of the short school years in Germany across cohorts and states. This variation allows me to identify the causal effect of the length of schooling on socioeconomic inequalities in educational attainment.

Table 2: Descriptive Statistics

	Mean	*SD*	*N*
Upper secondary education	0.42	0.49	15 931
Years of education	12.98	2.70	15 828
Household income (standardized)	0.00	1.00	15 876
High parental education	0.19	0.39	14 895
High maternal education	0.05	0.23	14 913
High paternal education	0.17	0.38	14 895
Parental years of education (highest)	10.92	2.71	15 690
Parental occupational status (ISEI)	42.22	16.01	13 081
Short school years	0.39	0.75	15 851
Male	0.49	0.50	15 964

Sources: NEPS SC6, v11, and SOEP, v36, (pooled).

The identification strategy of my study is motivated by the main analysis reported by Pischke (2007). However, it differs in crucial aspects, as Pischke (2007), in his main analysis, did not focus on exposure to the short school years during primary school.[14] I estimate a DiD model with the modification that there are before-treatment, treatment, and after-treatment groups with respect to the time dimension. Because of this setup, other time-confounding variables, such as educational reforms, are unlikely to bias the results, as these would usually be implemented at one point in time and affect all following cohorts (Pischke 2007). In contrast, the short school years were not a long-lasting policy change but an event that affected only one cohort. To be precise, I estimate the following types of models:

$$Y_{ist} = \alpha_0 + \alpha_1 O_{ist} + \alpha_2 S_{ist} + \alpha_3 O_{ist} \times S_{ist} + \alpha_4 M_{ist} + \alpha_5 N_{ist} + \zeta_s + \eta_t + \varepsilon_{ist} \quad (1)$$

where Y is the outcome of interest (the completion of upper secondary education, years of education, and household income) for individual i in state s from birth cohort t, O is the measure of social origin, and S is the continuous variable indicating the number of short school years to which a respondent was exposed (as indicated by Table 1). The interaction $S_{ist} \times O_{ist}$ estimates whether the effects of the short school years vary by social origin. This interaction is what the analysis focuses on, as it measures whether the intergenerational transmission of education is affected by the number of short school years.

The analysis includes a control for male (M), survey (N) and both state (s) and cohort (t) fixed effects (through dummy variables for each state and each year of birth). These controls ensure the analysis isolates the causal effects of the short school years on the intergenerational transmission of educational attainment. The fixed effects ensure the interaction between social origin and school years can be interpreted in a causal sense. They control for unobserved variables related to the birth year and state of residence.[15]

Table 3: OLS Regression Models Estimating the Effects of the Short School Years on the Completion of Upper Secondary Education

	(1)	(2)
High parental education	0.324*	0.331*
	(0.010)	(0.011)
Short school years	0.001	0.005)
	(0.011)	(0.011)
Male	0.114*	0.114*
	(0.008)	(0.008)
High parental education × Short school years		−0.017
		(0.013)
N	14 780	

Standard errors in parentheses. All models control for whether a respondent is male, the survey (NEPS or SOEP), as well as fixed effects for state and year of birth.
$* \ p < 0.05$ (two-tailed tests).
Sources: NEPS SC6, v11, and SOEP, v36, (pooled).

Results

Main Analysis

The results of my preferred specification are reported in Table 3. The table reports Linear Probability Models (LPMs) of the effects of the short school years on the completion of upper secondary education.[16] The interaction between social origin and high parental education is the focus of the analysis, as this interaction indicates whether the change in the length of schooling affected the intergenerational transmission of educational attainment.

The results are unequivocal. The intergenerational transmission of educational attainment was not affected by the short school years. The interaction between social origin and the short school years is statistically insignificant and substantively small. The estimate in Model 2 suggests each short school year decreased the intergenerational transmission of educational attainment by 1.7 percentage points. Given that the main effect of high parental education is 33.1 percentage points, this is a substantively negligible change. Moreover, the estimate is statistically insignificant and therefore not generalizable to the population level.[17]

Robustness Checks

I conducted several robustness checks to ensure the finding of no effect of the short school years on the intergenerational transmission of educational attainment is not due to a specific coding decision. This section reports these robustness checks.

First, Table 4 reports OLS regression models estimating the effects of the short school years on years of education. Again, the interaction between parental education and the short school years is both statistically insignificant and substantively small. Hence, using years of education as an outcome supports the conclusion

Table 4: OLS Regression Models Estimating the Effects of the Short School Years on Years of Education

	(1)	(2)
High parental education	2.235*	2.267*
	(0.053)	(0.060)
Short school years	0.035	0.050
	(0.059)	(0.060)
Male	0.472*	0.472*
	(0.041)	(0.041)
High parental education × Short school years		−0.077
		(0.068)
N	14 690	

Standard errors in parentheses. All models control for whether a respondent is male, the survey (NEPS or SOEP), as well as fixed effects for state and year of birth.
$* p < 0.05$ (two-tailed tests).
Sources: NEPS SC6, v11, and SOEP, v36, (pooled).

that the short school years did not affect the intergenerational transmission of educational attainment.[18]

Second, I investigate the effects of the short school years not only on socioeconomic differences in educational attainment but also on socioeconomic differences in income. I use household income, standardized within each survey to account for the variation across surveys, and estimate OLS regression models. These models, reported in Table 5, show that the association between parental education and offspring income was not affected by the short school years.

Third, instead of a dummy variable indicating a high level of parental education, I also estimate models using parental years of education as a measure of social

Table 5: OLS Regression Models Estimating the Effects of the Short School Years on Household Income (standardized)

	(1)	(2)
High parental education	0.304*	0.319*
	(0.022)	(0.025)
Short school years	0.030	0.037
	(0.024)	(0.025)
Male	0.106*	0.106*
	(0.017)	(0.017)
High parental education × Short school years		−0.035
		−0.035
N	14 738	

Standard errors in parentheses. All models control for whether a respondent is male, the survey (NEPS or SOEP), as well as fixed effects for state and year of birth.
$* p < 0.05$ (two-tailed tests).
Sources: NEPS SC6, v11, and SOEP, v36, (pooled).

Table 6: OLS Regression Models Estimating the Effects of the Short School Years on the Completion of Upper Secondary Education Using Parental Years of Education to Measure Social Origin

	(1)	(2)
High parental education	0.056*	0.056*
	(0.002)	(0.002)
Short school years	−0.002	0.001
	(0.011)	(0.023)
Male	0.112*	0.112*
	(0.007)	(0.007)
High parental education × Short school years		0.000
		(0.002)
N	15 545	

Standard errors in parentheses. All models control for whether a respondent is male, the survey (NEPS or SOEP), as well as fixed effects for state and year of birth.
$* \ p < 0.05$ (two-tailed tests).
Sources: NEPS SC6, v11, and SOEP, v36, (pooled).

origin. These models are reported in Table 6. The estimates of these models fully support the main conclusion of the analysis, according to which the short school years had no effect on the intergenerational transmission of educational attainment. The interaction between parental years of education and the short school years is zero and statistically insignificant.

Fourth, I use parental occupational status (ISEI) instead of parental education as a measure of social origin. These models, which are reported in Table 7, demonstrate that the association between parental occupation and child education was also not affected by the short school years.

Conclusion and Discussion

How does more schooling affect the intergenerational transmission of educational attainment? This study reports results from a natural experiment to answer this question. The findings are robust across different specifications and demonstrate that the short school years in Germany in 1966/1967 neither increased nor reduced socioeconomic inequalities in educational attainment.

These findings are at odds with two opposing theoretical perspectives motivating this type of research. On the one hand, the findings do not confirm the predictions of the dynamics of skill formation model (Cunha and Heckman 2007) and of critical theories of education (Bourdieu and Passeron 1966, 1970; Bourdieu 1979; Bowles and Gintis 1976, 2002; Willis 1978), which argue that more schooling increases the intergenerational transmission of educational attainment. On the other hand, these findings also do not confirm the more recent notion that more schooling equalizes educational outcomes among children from different socioeconomic backgrounds (Downey et al. 2004; Raudenbush and Eschmann 2015).[19]

Table 7: OLS Regression Models Estimating the Effects of the Short School Years on the Completion of Upper Secondary Education Using Parental Occupational Status (ISEI) to Measure Social Origin

	(1)	(2)
High parental education	0.009*	0.009*
	(0.000)	(0.000)
Short school years	−0.001	0.010
	(0.012)	(0.019)
Male	0.110*	0.110*
	(0.008)	(0.008)
High parental education × Short school years		0.000
		(0.000)
N	13 002	

Standard errors in parentheses. All models control for whether a respondent is male, the survey (NEPS or SOEP), as well as fixed effects for state and year of birth.
$* \ p < 0.05$ (two-tailed tests).
Sources: NEPS SC6, v11, and SOEP, v36, (pooled).

The findings of the present study may also seem at odds with some studies that investigated the consequences of the Covid-19-related school closures on educational inequality. For instance, a recent overview of this large amount of literature (Betthäuser, Bach-Mortensen, and Engzell 2023) concludes that most but not all studies found increases in educational inequalities due to the school closures induced by measures to fight the spread of the coronavirus. The specific situation in the historic case I study is quite different from these Covid-19-related school closures. During Covid-19-related school closures, schooling continued often online whilst schools were physically closed, which may have led to differences in school learning online between different socioeconomic groups. In the case of the short school years, we estimate the effect of children spending less time in primary school. The children affected by the short school years finished primary school at a younger age than children not affected by the short school years. In that sense, the situations are different and hardly comparable. In terms of policy relevance, there is relevance in studying the short school years because if we think about policies that could be implemented, these could be about extending the time children spend in primary school (e.g., by extending the school day or re-opening schools on Saturdays or other measures; see Raudenbush and Eschmann 2015). The results of the present study may be read in suggesting that such policies may not increase equality of educational opportunity.

Although the results of the present study are at odds with these theories, they actually align with a number of classical sociological studies that have suggested that the intergenerational transmission of education is due mainly to factors operating outside (and not within) schools (Coleman et al. 1966; Jencks et al. 1972). In

addition, various other recent empirical studies have also suggested that schooling neither reduces nor increases socioeconomic inequalities in education. For instance, with respect to a much more recent cohort of German school children than the one analyzed in the present study, Skopek and Passaretta (2021) found that socioeconomic inequalities in educational performance emerge before formal schooling takes place and are largely constant during the school career. These findings are mirrored by results for the United States, according to which socioeconomic inequalities in educational performance emerge before school starts and vary little over the school career (von Hippel and Hamrock 2019).

In terms of causally oriented designs, other natural experiments have also found that schooling does not affect socioeconomic inequalities in educational performance. Passaretta and Skopek (2021) exploited variation in the age at school entry and the age at testing in the first year in primary school to estimate the effects of the length of schooling on socioeconomic inequalities in educational performance in Germany. They found no such effects, which aligns with the results of the present study. Similar results were obtained by Carlsson et al. (2015), who analyzed intelligence scores from male military conscription tests in Sweden. The findings of these studies also match the results reported by von Hippel and Hamrock (2019), according to which the evidence regarding whether socioeconomic differences in test scores grow more during the school year or during the summer holidays in the United States is inconclusive.

Finally, suggestive support for the idea that schooling plays a rather limited role in the intergenerational transmission of education comes from research comparing socioeconomic inequalities in education across countries. This research has not managed to provide a consistent and robust ranking of countries in terms of such inequalities (Breen and Jonsson 2005; Triventi et al. 2020; Grätz et al. 2021). Therefore, it is unlikely that school characteristics, which vary across countries, have strong effects on socioeconomic inequalities in education.[20] Triventi et al. (2020) summarized the results of a project comparing socioeconomic inequalities in education across 17 countries with different education systems and argued that socioeconomically advantaged families always find ways to transmit educational advantage to their offspring.

For all these reasons, the findings of the present study, although certainly arising in a specific context, are part of a more general pattern. As a consequence, social scientists interested in explaining the intergenerational transmission of educational advantage could take up again an already old idea to change their focus of attention from school to non-school factors that influence educational inequalities (Coleman et al. 1966; Jencks et al. 1972). Further progress in this area may require a better understanding of which processes operating outside school (e.g., within families, neighborhoods, and among peer groups) affect socioeconomic inequalities in education.

Notes

1 These two studies did, however, report only a before-after comparison, did not employ a control group, and used only data on one of the eight treatment states in West Germany.

2 Contrary to Pischke (2007), a recent working paper by Cygan-Rehm (2022) found negative main effects of the short school years on earnings and employment but, in line with the present study, no main effects on educational attainment.

3 In the terminology used by Jackson and Jonsson (2013) and others, socioeconomic differences in educational attainment can be decomposed into "primary effects" (i.e., socioeconomic differences in educational performance) and "secondary effects" (i.e., socioeconomic differences in educational attainment net of socioeconomic differences in educational performance).

4 For a formal model of cultural capital theory, see Jæger and Breen (2016).

5 The cohort studied by Willis (1978) was affected by the raise in the school leaving age (RSLA) in England, a 1972 educational reform that increased the minimum school leaving age from 15 to 16. Sturgis and Buscha (2015) showed that this reform had largely no effects on the intergenerational transmission of advantage, confirming Willis' (1978) ethnographic observations.

6 The city was Saarbrücken, which lies in the state of Saarland.

7 By doing so, I follow the approach of Skopek and Leopold (2020).

8 As Hamburg experienced a long short school year (running from April until August one year later), I also estimate models that drop Hamburg from the analysis and therefore only include students from Bavaria in the control group. These models are reported in Table S4 in the *Online Supplement* and report virtually identical results to those that include students from Hamburg.

9 Table S1 in the *Online Supplement* demonstrates that the findings do not differ if, instead of looking at the highest level of parental education, I look at maternal or paternal education.

10 ISEI ranges from 16 to 90.

11 The results are robust to operationalizing the short school years through two dummy variables, one of which is set to 1 for students who experienced one short school year in primary school and one of which is set to 1 for students who experienced two short school years in primary school. This specification, which is reported in Table S2 in the *Online Supplement*, leads to results that are virtually identical to those for the specification using a continuous variable reported in the main text.

12 Students in secondary school were also affected by the short school years. I focus, however, on primary school, as I am interested in how the short school years affected the transition to secondary school. After the transition is made, there is little movement between secondary school tracks in Germany, in particular among the cohorts I examine (Hillmert and Jacob 2010; Henninges, Traini, and Kleinert 2019). As a robustness check, I also estimated models without the oldest cohort, who was affected by the short school years in secondary school. These models, which are reported in Table S3 in the *Online Supplement*, lead to virtually identical results than those that include this cohort.

13 An exception is Lower Saxony, a state in which no students entered primary school in first grade in December 1966 (Pischke 2007). The students born between January and June 1960 in Lower Saxony entered school in August 1967 and experienced no short school year.

14 In one part of his analysis, Pischke (2007) isolated the effects of the short school years in primary school. This part of his analysis is more closely related to ours. However, Pischke (2007) did not investigate socioeconomic differences in the effects of the short school years, which are the central focus of my study.

15 I also conducted a robustness check, which did not include year of birth fixed effects but a linear trend across cohorts. The results of this alternative and less restrictive model are reported in Table S5 in the *Online Supplement*. They fully align with the results reported in the main specification, which uses year of birth fixed effects.

16 I report LPMs instead of logistic regression models because of the more straightforward interpretation of the coefficients of the former and because of their stronger robustness to the inclusion of interaction and fixed effects, which are both necessary for the present analysis (Ai and Norton 2003; Angrist and Pischke 2009; Mood 2010; Gomila 2021).

17 I conducted a formal power analysis using G*Power (Faul et al. 2009) and calculated a theoretical expected estimate of the effect size based on two empirical findings from previous research. First, according to Passaretta and Skopek (2021:1034), 6 months of schooling increased educational performance by at least 24% of a standard deviation (that is their lower bound estimate). Second, according to Jackson and Jonsson (2013:321), 55% of the association between social origin and children's educational attainment are due to socioeconomic differences in educational performance. Combining these two estimates leads us, under the hypothesis that the consequences of the length of schooling were to differ by SES (which is the hypothesis tested in the present analysis), to expect an effect size of $0.24 \times 0.55 = 13.2\%$ of a standard deviation. The standard deviation of the outcome is 0.49 (see Table 2) below. Therefore, we would expect an effect of $0.132 \times 0.49 = 6.5\%$. Using the usual value of alpha set to 0.05 and the sample size of 14 780 used for the models reported in Table 3 gives a power of 1.

18 Table S6 in the *Online Supplement* reports a robustness check using the completion of university education as an outcome. These models find no evidence for a change in the intergenerational transmission of education due to the short school years either.

19 Raudenbush and Eschmann (2015) argued that the equalizing effect of schools on socioeconomic inequalities in educational performance should vary by child age. The present study investigates the consequences of the length of schooling in primary school at age 6–10. It could be that the equalizing effect of schooling is only found for *kindergarten* and other forms of child care before school starts.

20 An exception is age at tracking. Previous research found robust causal evidence that reforms that increased the age of the first allocation to different tracks in an education system increased educational mobility (e.g., van de Werfhorst 2019).

References

Ai, Chunrong, and Edward C. Norton. 2003. "Interaction Terms in Logit and Probit Models." *Economics Letters* 80:123–9. http://dx.doi.org/10.1016/S0165-1765(03)00032-6

Alexander, Karl L., Doris R. Entwisle, and Linda S. Olson. 2001. "Schools, Achievement and Inequality: A Seasonal Perspective." *Educational Evaluation and Policy Analysis* 23:171–91. http://dx.doi.org/10.3102/01623737023002171

Alexander, Karl L., Doris R. Entwisle, and Linda S. Olson. 2007. "Lasting Consequences of the Summer Learning Gap." *American Sociological Review* 72:167–80. http://dx.doi.org/10.1177/000312240707200202

Angrist, Joshua D., and Jörn-Steffen Pischke. 2009. *Mostly Harmless Econometrics: An Empiricist's Companion.* Princeton: Princeton University Press. http://dx.doi.org/10.1515/9781400829828

Armstrong, Elizabeth, and Laura T. Hamilton. 2015. *Paying for the Party.* Cambridge, MA: Harvard University Press.

Betthäuser, Bastian A., Anders M. Bach-Mortensen, and Per Engzell. 2023. "A Systematic Review and Meta-Analysis of the Evidence on Learning during the COVID-19 Pandemic." *Nature Human Behavior* 7:375–85. http://dx.doi.org/10.1038/s41562-022-01506-4

Blossfeld, Hans-Peter, Hans-Günter Roßbach, and Jutta von Maurice (Eds.). 2011. *Education as a Lifelong Process: The German National Educational Panel Study (NEPS), Zeitschrift für Erziehungswissenschaft Special Issue 14.* Wiesbaden: VS Verlag für Sozialwissenschaften.

Bourdieu, Pierre. 1979. *La Distinction: Critique Sociale du Jugement.* Paris: Les Editions de Minuit.

Bourdieu, Pierre, and Jean-Claude Passeron. 1966. *Les Héritiers: Les Etudiants et la Culture.* Paris: Les Editions de Minuit.

Bourdieu, Pierre, and Jean-Claude Passeron. 1970. *La Reproduction: Eléments pour une Théorie du Système d'Enseignement.* Paris: Les Editions de Minuit.

Bowles, Samuel, and Herbert Gintis. 1976. *Schooling in Capitalist America: Educational Reform and the Contradictions of Economic Life.* New York: Basic Books.

Bowles, Samuel, and Herbert Gintis. 2002. "Schooling in Capitalist America Revisited." *Sociology of Education* 75:1–18. http://dx.doi.org/10.2307/3090251

Bradbury, Bruce, Miles Corak, Jane Waldfogel, and Elizabeth Washbrook. 2015. *Too Many Children Left Behind: The U.S. Achievement Gap in Comparative Perspective.* New York: Russel Sage Foundation.

Breen, Richard, and Jan O. Jonsson. 2005. "Inequality of Opportunity in Comparative Perspective: Recent Research on Educational Attainment and Social Mobility." *Annual Review of Sociology* 31:223–43. http://dx.doi.org/10.1146/annurev.soc.31.041304.122232

Burkam, David T., Douglas D. Ready, Valerie E. Lee, and Laura F. LoGerfo. 2004. "Social-Class Differences in Summer Learning between Kindergarten and First Grade: Model Specification and Estimation." *Sociology of Education* 77:1–31. http://dx.doi.org/10.1177/003804070407700101

Calarco, Jessica M. 2018. *Negotiating Opportunities: How the Middle Class Secures Advantages in School.* Oxford: Oxford University Press.

Carlsson, Magnus, Gordon B. Dahl, Björn Öckert, and Dan-Olof Rooth. 2015. "The Effect of Schooling on Cognitive Skills." *The Review of Economics and Statistics* 97:533–47. http://dx.doi.org/10.1162/REST_a_00501

Coleman, James S., Ernest Q. Campbell, Carol J. Hobson, James McPartland, Alexander M. Mood, Frederick D. Weinfeld, and Robert L. York. 1966. *Equality of Educational Opportunity.* Washington: U.S. Department of Health, Education, and Welfare, Office of Education.

Condron, Dennis J., Douglas B. Downey, and Megan Kuhfeld. 2021. "Schools as Refractors: Comparing Summertime and School-Year Skill Inequality Trajectories." *Sociology of Education* 94:316–40. http://dx.doi.org/10.1177/00380407211041542

Cunha, Flavio, and James J. Heckman. 2007. "The Technology of Skill Formation." *American Economic Review* 97:31–47. http://dx.doi.org/10.1257/aer.97.2.31

Cygan-Rehm, Kamila. 2022. "Lifetime Consequences of Lost Instructional Time in the Classroom: Evidence from the Shortened School Years." *Cesifo Working Papers,* No. 9892. http://dx.doi.org/10.2139/ssrn.4196288

Dahrendorf, Ralf. 1965. *Bildung ist Bürgerrecht.* Hamburg: Nannen.

Davis, Kingsley, and Wilbert E. Moore. 1945. "Some Principles of Stratification." *American Sociological Review* 10:242–9. http://dx.doi.org/10.2307/2085643

Dewey, John. 1966. *Democracy and Education.* New York: The Free Press.

Downey, Douglas B., Paul T. von Hippel, and Beckett A. Broh. 2004. "Are Schools the Great Equalizer? Cognitive Inequality During the Summer Months and the School Year." *American Sociological Review* 69:613–35. http://dx.doi.org/10.1177/000312240406900501

Entwisle, Doris R., and Karl L. Alexander. 1992. "Summer Setback: Race, Poverty, School Composition and Math Achievement in the First Two Years of School." *American Sociological Review* 57:72–84. http://dx.doi.org/10.2307/2096145

Faul, Franz, Edgar Erdfelder, Axel Buchner, and Albert-Georg Lang. 2009. "Statistical Power Analyses Using G*Power 3.1: Tests for Correlation and Regression Analyses." *Behavior Research Methods* 41:1149–60. http://dx.doi.org/10.3758/BRM.41.4.1149

Ganzeboom, Harry B. G., and Donald J. Treiman. 1996. "Internationally Comparable Measures of Occupational Status for the 1988 International Standard Classification of Occupations." *Social Science Research* 25:201–39. http://dx.doi.org/10.1006/ssre.1996.0010

Goebel, Jan, Markus M. Grabka, Stefan Liebig, Martin Kroh, David Richter, Carsten Schröder, and Jürgen Schupp. 2019. "The German Socio-Economic Panel Study (SOEP)." *Jahrbücher für Nationalökonomie und Statistik / Journal of Economics and Statistics* 239:345–60. http://dx.doi.org/10.1515/jbnst-2018-0022

Gomila, Robin. 2021. "Logistic or Linear? Estimating Causal Effects of Experimental Treatments on Binary Outcomes using Regression Analysis." *Journal of Experimental Psychology: General* 150:700–9. http://dx.doi.org/10.1037/xge0000920

Grätz, Michael, Kieron J. Barclay, Torkild H. Lyngstad, Øyvind N. Wiborg, Jani Erola, Aleksi Karhula, Patrick Präg, Thomas Laidley, and Dalton Conley. 2021. "Sibling Similarity in Education Across and Within Societies." *Demography* 58:1011–37. http://dx.doi.org/10.1215/00703370-9164021

Hanushek, Eric A. 1979. "Conceptual and Empirical Issues in the Estimation of Production Functions." *Journal of Human Resources* 14:351–88. http://dx.doi.org/10.2307/145575

Heckman, James J. 2000. "Policies to Foster Human Capital." *Research in Economics* 54:3–56. http://dx.doi.org/10.1006/reec.1999.0225

Helbig, Marcel, and Rita Nikolai. 2015. *Die Unvergleichbaren: Der Wandel der Schulsysteme in den deutschen Bundesländern seit 1949.* Bad Heilbrunn: Verlag Julius Klinkhardt.

Henninges, Miriam, Claudia Traini, and Corinna Kleinert. 2019. "Tracking and Sorting in the German Educational System." *Leibniz Institute for Educational Trajectories (LIfBi) Working Paper No. 83.*

Heyns, Barbara. 1978. *Summer Learning and the Effects of Schooling.* New York: Academic Press.

Heyns, Barbara. 1987. "School and Cognitive Development: Is There a Season for Learning?" *Child Development* 58:1151–60. http://dx.doi.org/10.2307/1130611

Hillmert, Steffen, and Marita Jacob. 2010. "Selections and Social Selectivity on the Academic Track: A Life-Course Analysis of Educational Attainment in Germany." *Research in Social Stratification and Mobility* 28:59–76. http://dx.doi.org/10.1016/j.rssm.2009.12.006

Holtmann, Anne-Christine, and Fabrizio Bernardi. 2019. "The Equalizing Effect of Schools and its Limits." Pp. 253–67 in *Research Handbook on the Sociology of Education*, edited by R. Becker. Cheltenham, UK: Edward Elgar Press. http://dx.doi.org/10.4337/9781788110426.00024

Jackson, Michelle, and Jan O. Jonsson. 2013. "Why Does Inequality of Educational Opportunity Vary Across Countries? Primary and Secondary Effects in Comparative Context." Pp. 306–37 in *Determined to Succeed? Performance and Choice in Educational Attainment*, edited by M. Jackson. Stanford, CA: Stanford University Press. http://dx.doi.org/10.2307/j.ctvqsdrjr.15

Jaeger, Mads Meier, and Richard Breen. 2016. "A Dynamic Model of Cultural Reproduction." *American Journal of Sociology* 121:1079–115. http://dx.doi.org/10.1086/684012

Jencks, Christopher, Marshall Smith, Henry Acland, Mary Jo Bane, David Cohen, Herbert Gintis, Barbara Heyns, and Stephan Michelson. 1972. *Inequality: A Reassessment of the Effect of Family and Schooling in America.* New York: Basic Books.

Laidley, Thomas, and Dalton Conley. 2018. "The Effects of Active and Passive Leisure on Cognition in Children: Evidence from Exogenous Variation in Weather." *Social Forces* 97:129–56. http://dx.doi.org/10.1093/sf/soy020

Lareau, Annette. 2011. *Unequal Childhoods: Class, Race, and Family Life.* Berkeley: University of California Press. http://dx.doi.org/10.1525/9780520949904

Meister, Hans. 1972. "Zur Unangemessenheit des Anfangsunterrichts in der Grundschule: Vergleichende Untersuchung des Einflusses der Kurzschuljahre auf Schulleistungen." Dissertation, Universität des Saarlandes.

Mood, Carina. 2010. "Logistic Regression: Why We Cannot Do What We Think We Can Do, and What We Can Do About It." *European Sociological Review* 26:67–82. http://dx.doi.org/10.1093/esr/jcp006

Oakes, Jeannie. 2005. *Keeping Track: How Schools Structure Inequality. Second Edition.* New Haven: Yale University Press.

Parsons, Talcott. 1959. "The School Class as a Social System." *Harvard Education Review* 29:297–318.

Passaretta, Giampiero, and Jan Skopek. 2021. "Does Schooling Decrease Socioeconomic Inequality in Early Achievement? A Differential Exposure Approach." *American Sociological Review* 86(6):1017–42. http://dx.doi.org/10.1177/00031224211049188

Pischke, Jörn-Steffen. 2007. "The Impact of Length of the School Year on Student Performance and Earnings: Evidence from the German Short School Years." *The Economic Journal* 117:1216–42. http://dx.doi.org/10.1111/j.1468-0297.2007.02080.x

Raudenbush, Stephen W., and Robert D. Eschmann. 2015. "Does Schooling Increase or Reduce Social Inequality?" *Annual Review of Sociology* 41:443–70. http://dx.doi.org/10.1146/annurev-soc-071913-043406

Skopek, Jan, and Thomas Leopold. 2020. "Educational Reproduction in Germany: A Prospective Study Based on Retrospective Data." *Demography* 57:1241–70. http://dx.doi.org/10.1007/s13524-020-00896-2

Skopek, Jan, and Giampiero Passaretta. 2021. "Socioeconomic Inequality in Children's Achievement from Infancy to Adolescence: The Case of Germany." *Social Forces* 100:86–112. http://dx.doi.org/10.1093/sf/soaa093

Sorokin, Pitirim A. 1959. *Social and Cultural Mobility.* New York: The Free Press.

Sturgis, Patrick, and Franz Buscha. 2015. "Increasing Inter-Generational Social Mobility: Is Educational Expansion the Answer?" *British Journal of Sociology* 66(3):512–33. http://dx.doi.org/10.1111/1468-4446.12138

Thiel, Berthold. 1973. "Die Auswirkung verkürzter Unterrichtszeit auf die Schulleistung: Untersuchung zur Problematik der Kurzschuljahre." Dissertation, Eberhard-Karls Universität Tübingen.

Triventi, Moris, Jan Skopek, Nevena Kulic, Sandra Buchholz, and Hans-Peter Blossfeld. 2020. "Advantage 'finds its way': How Privileged Families Exploit Opportunities in Different Systems of Secondary Education." *Sociology* 54:237–57. http://dx.doi.org/10.1177/0038038519874984

Van de Werfhorst, Herman G. 2019. "Early Tracking and Social Inequality in Educational Attainment: Educational Reforms in 21 European Countries." *American Journal of Education* 126:65–99. http://dx.doi.org/10.1086/705500

Verachtert, Pieter, Jan Van Damme, Patrick Onghena, and Pol Ghesquière. 2009. "A Seasonal Perspective on School Effectiveness: Evidence from a Flemish Longitudinal Study in Kindergarten and First Grade." *School Effectiveness and School Improvement* 20:215–33. http://dx.doi.org/10.1080/09243450902883896

Von Hippel, Paul T., and Caitlin Hamrock. 2019. "Do Test Score Gaps Grow Before, During, or Between the School Years? Measurement Artifacts and What We Can Know in Spite of Them." *Sociological Science* 6:43–80. http://dx.doi.org/10.15195/v6.a3

Von Hippel, Paul T., Joseph Workman, and Douglas B. Downey. 2018. "Inequality in Reading and Math Skills Forms Mainly before Kindergarten: A Replication, and Partial Correction, of 'Are Schools the Great Equalizer?'" *Sociology of Education* 91:323–57. http://dx.doi.org/10.1177/0038040718801760

Willis, Paul. 1978. *Learning to Labour: How Working Class Kids get Working Class Jobs.* Farnborough: Saxon House.

Workman, Joseph, Paul T. von Hippel, and Joseph Merry. 2023. "Findings on Summer Learning Loss Often Fail to Replicate, Even in Recent Data." *Sociological Science* 10:251–85. http://dx.doi.org/10.15195/v10.a8

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